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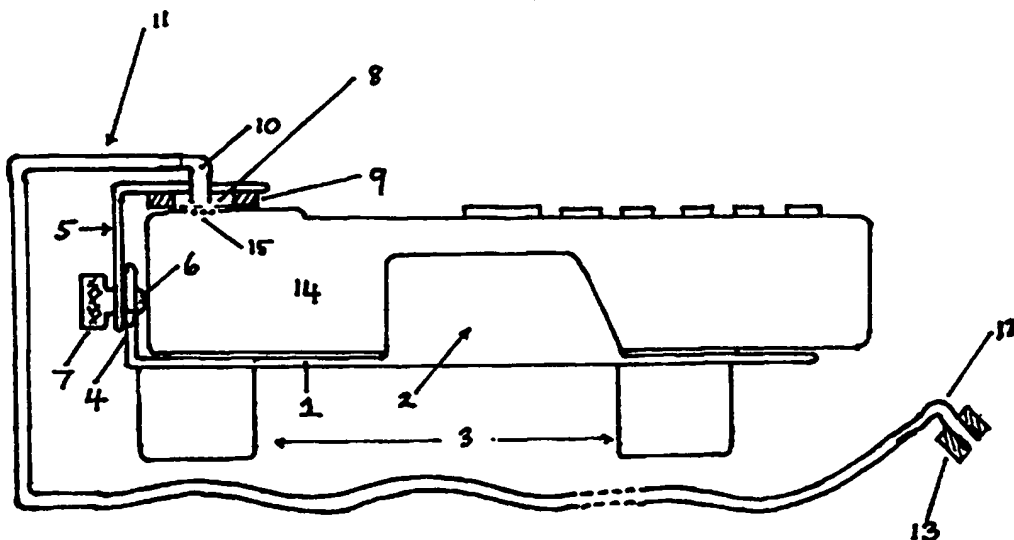
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(54) Title: ACOUSTICALLY COUPLED HANDS FREE ADAPTOR FOR MOBILE TELEPHONES



(57) Abstract

An acoustically coupled hands free adaptor for mobile phones is described. The adaptor is a cradle with an adjustably fixable acoustic coupling cavity which couples automatically to the earpiece of a mobile phone that is inserted into the cradle. A sound tube is connected to the acoustic coupling cavity to conduct the sound to an external earpiece or electronic processing unit.

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ACOUSTICALLY COUPLED HANDS FREE ADAPTOR FOR MOBILE TELEPHONES.

**5 The present invention relates to apparatus which when used in conjunction
with a normal hand held mobile telephone hereafter called mobile
telephone enables such a telephone to be used for two way conversation
without the necessity for the said mobile telephone to be held to the ear of
the user and thus leaving the users hands free to perform other tasks such
as driving a motor vehicle.**

10

**In particular this invention relates to hands free apparatus that does not
require any electrical power or electronic amplification to perform its
function.**

**15 The use of mobile phones in the normal way whilst driving a motor vehicle
is considered a safety hazard in many countries and legislation is in place
or being prepared to make the practice illegal.**

**20 There are designs of electronic hands free adaptors or add on units which
use microphones external to the telephone, electronic processing and
amplifying circuitry and electrical loudspeakers or earphones to perform
the hands free function when used in conjunction with a normal hand held
mobile telephone.**

**25 The said electronic designs usually are connected into the
electronic circuitry of the mobile telephone**

**The said electronic designs require operating power which is usually
obtained from the motor vehicles electrical system.**

The said electronic designs along with the mechanical housing and telephone cradle associated with them are usually fixed into the motor vehicle by fasteners such as screws and they require installation by specialists although there are some electronic designs available which are not fixed but simply plug into the motor vehicle cigarette lighter socket to obtain electrical power and are plugged also by a cable and connector into the mobile telephone electronics circuitry.

A major disadvantage of the need to connect to the mobile telephone circuitry is the fact that there are a large number of different mobile telephone manufacturers and model types with consequently differing electronic circuitry and electrical connector configurations.

The aforementioned large range of mobile telephone types necessarily requires many different models of hands free adaptors to cover a significant number of mobile telephone models and types.

The hands free apparatus of this present invention may reduce costs when compared with the said electronic designs because it contains no electronic circuitry or microphones or loudspeakers and thus requires fewer components than the said electronic designs.

The hands free apparatus of this present invention may reduce costs when compared to the said electronic designs because it requires no specialist

installation and has no electrical wiring to be connected into the motor vehicles electrical system.

The hands free apparatus of this present invention may be successfully used with a wide range of models and types of mobile telephones when compared with a single model of the said electronic designs because the apparatus of this present invention does not require to be connected to the electronic circuitry of the mobile telephone and hence the need for different electrical connectors for different mobile telephone models and types is eliminated.

The apparatus of this present invention provides a mobile telephone hands free adaptor comprising a holder hereafter called the cradle which holds and positions the mobile telephone in a location in the motor vehicle which is close enough to the mobile telephone users mouth for adequate voice pick up by the normal microphone of the mobile telephone when the mobile telephone user is seated in the driver seat of the motor vehicle.

The cradle provides an acoustic coupling chamber here after called the acoustic coupling cavity which seals over the earpiece area of the mobile telephone when the mobile telephone is placed into the cradle.

The mechanism on which the acoustic coupling cavity is mounted is adjustable so that the acoustic coupling cavity may be moved and set up in different positions to accommodate mobile telephones of differing dimensions.

An outlet from the acoustic coupling cavity is connected to a flexible sound transmission tube of sufficient length to reach the car or cars of

the mobile telephone user when seated in the drivers seat of the motor vehicle.

5 An ear piece of suitable material and shape to fit into the ear of the mobile telephone user is provided to the end of the sound transmission tube so that the sound energy from the tube will be conducted efficiently into the users ear.

10 Alternatively instead of an earpiece the end of the sound tube can be adapted to feed the acoustic energy into an electronic processing device to produce loudspeaker or electrical output.

15 In one form of the invention the cradle consists of an elongated plate with downward protrusions which fit into the motor vehicle drivers side window cavity and so hold the plate resting on the window ledge.

In another form of the invention the said downward protrusions are eliminated and the said plate is fastened to the drivers side window ledge by a hook and loop fastener system such as velcro ® and it will be realised
20 that with this type of fastening system the invention may be mounted on other surfaces with in the motor vehicle instead of just the drivers side window ledge, The said plate also provides one or more upward protrusions which are positioned to keep the mobile phone in place on its back on the plate.

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The said plate also provides a slotted upward protrusion at the end of the plate corresponding to the earpiece end of the mobile telephone and to this

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protrusion by means of a screw and finger nut or other fastener a moveable slotted bracket is provided which holds an acoustic coupling cavity with a resilient seal which can be positioned to seal over the earpiece of mobile phones of differing dimensions by adjusting the bracket relative to the

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slotted protrusion and setting the position by tightening the finger nut or other fastener.

Once set for a particular mobile telephone that mobile telephone can be

10 placed into the cradle to automatically obtain an acoustic seal over the mobile telephone earpiece and the mobile telephone may be removed and replaced in the cradle at will without the need to readjust the acoustic coupling cavity position.

15 The inner diameter of the acoustic coupling cavity which is preferably circular in shape is made sufficiently large in diameter to allow some off centredness of the mobile telephone with respect to the acoustic coupling cavity so that mobile telephones of various widths or with various earpiece outlet positions can be accommodated whilst maintaining a good acoustic
20 seal.

A sound transmission tube is provided for transmission of the sound from an opening in the acoustic coupling cavity to an earpiece or adaptor to couple the sound into the mobile telephone users ear or as previously
25 mentioned to an electronic processing device.

The cradle including the movable slotted bracket may be made from any suitable material such as metal or moulded plastic.

6

The acoustic coupling cavity resilient seal can be made of any suitable material such as rubber or foam plastic.

5 The sound transmission tube may be made from any suitable flexible material such as rubber or plastic.

To assist with the understanding of the invention , references will now be made to the accompanying drawings.

10 In the drawings

FIG 1 Shows a side view of the invention with a representative mobile telephone in the cradle and with a cross sectional view of the acoustic coupling cavity.

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FIG 2 Shows an end view of the invention without a mobile phone in the cradle and with a cross sectional view of the acoustic coupling cavity.

Referring to fig 1 it can be seen that the acoustically coupled hands free
20 adaptor of this invention comprises an elongated plate 1 on which the back of the mobile phone 14 sits and an upward projection 2 which keeps mobile phone in its correct position on the plate.

Downward projections 3 from the opposite side edge of the plate 1 are for
25 fitting down into the motor vehicle drivers side window cavity in order to

hold the entire assembly in position with the underside of plate 1 resting on the drivers side window ledge.

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Upward projection 4 has a slot running up and down its length and is fastened through the slot by screw 6 and finger nut 7 to slotted bracket 5 which supports acoustic cavity 8 formed by resilient seal 9.

- 5 Angled elbow 10 connects the acoustic coupling cavity 8 to the sound transmission tube 11 which conducts the sound from the acoustic chamber 8 to the earpiece comprising angled elbow 12 and resilient pad 13.

- Thus it can be seen that sound from the mobile telephone earpiece 15 is conveyed via acoustic coupling cavity sound tube 11 to the earpiece 12 and 13 and hence to the ear of the mobile telephone user who consequently does not have to hold the telephone and the sound from the mobile telephone users voice is picked up successfully by the normal microphone of the mobile telephone 14 because the mounting position ie. drivers side window ledge is relatively close to the users mouth to give adequate transmission by the mobile phone system.

Fig 2 shows and end view of the invention with the same component numbering as fig 1.

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The relative positions and angles of 1, 2, 3 and 4 can be seen more clearly in this drawing as well as the slots in 4 and 5 and the only component not visible in this drawing is finger nut 7.

The angle of downward projection 3 may be approximately 90 degrees with respect to plate 1 or less than 90 degrees so that the mobile telephone will be tilted towards the interior of the motor vehicle and held against

upward projection 2 by gravity and also the mobile telephone display screen may be more easily viewed by the mobile telephone user.

5 The relative position of upward projection 2 and downward projection 3 are shown in Fig 1 and Fig 2 as for right hand drive vehicles. ie for mounting of the invention on the right hand side window ledge of the motor vehicle.

10 For left hand drive vehicles (ie) for mounting of the invention on the left side window ledge of a left hand drive motor vehicle, upward projection 2 would be on the opposite side of plate 1 from that shown in the drawings and downward projection 3 would be on the opposite side of plate 4 from that shown in the drawings.

15 The drawings of Fig 1 and Fig 2 show the basis of a preferred embodiment of the invention but it is to be understood that various alterations, modifications and / or additions may be introduced into the construction and arrangements of parts previously described without departing from the spirit or ambit of the invention.

CLAIMS

1. An acoustically coupled hands free adaptor for mobile telephones comprising a cradle providing an adjustably fixable position acoustic coupling cavity which is provided to couple automatically to the earpiece of a mobile telephone type that it has been adjusted and fixed to suit when that type mobile telephone is inserted into the cradle.
2. The acoustically coupled hands free adaptor of claim 1 wherein a flexible sound tube is connected to the acoustic coupling cavity for transmission of the acoustic energy from the acoustic coupling cavity to an external earpiece or an electronic processing unit.
3. The acoustically coupled hands free adaptor of claim 2 wherein the cradle provides one or more downward projections adapted to fit down into the window cavity of a side window of a motor vehicle to hold the cradle mounted on the inside ledge of the said side window.
4. The acoustically coupled hands free adaptor of claim 2 wherein the cradle maybe mounted on any suitable surface in a motor vehicle or other location by means of a loop and hook fastener system such as Velcro (R)
- 5 An acoustically coupled hands free adaptor for mobile telephones substantially as herein described with reference to the accompanying drawings.

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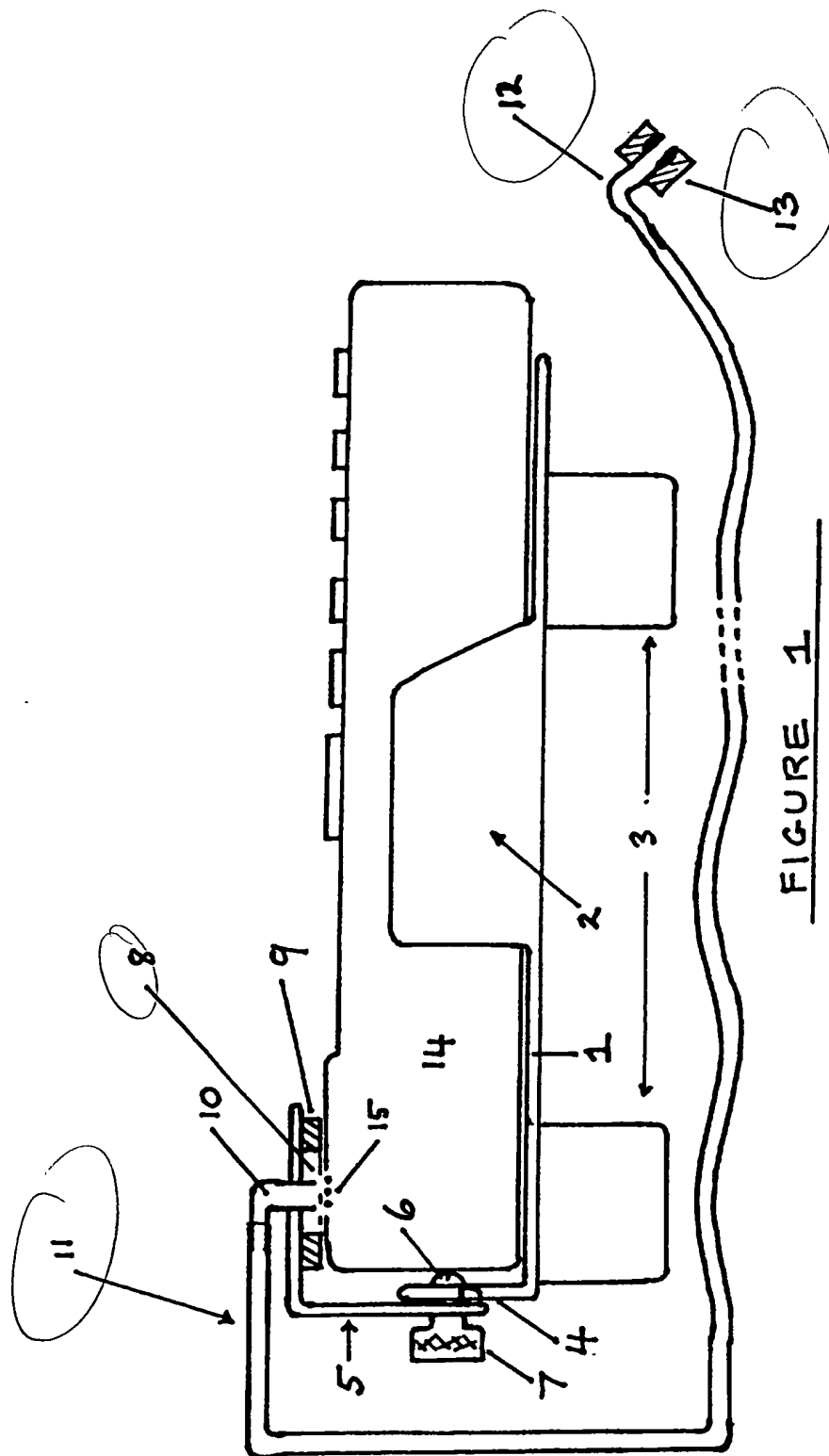


FIGURE 1

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 96/0649

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl⁶: B60R 11/02; G10K 11/22; H04M 1/04, 1/06, 1/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC : B60R 11/02; G10K 11/22; H04M 1/04, 1/06, 1/12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	AU 55671/86 A (AMALGAMATED WIRELESS (AUSTRALASIA) LTD) 9 October 1986	1-5
A	AU 55672/86 A (AMALGAMATED WIRELESS (AUSTRALASIA) LTD) 9 October 1986	1-5
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Date of the actual completion of the international search

30 January 1997

Date of mailing of the international search report

10 FEB 1997

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